

NOTES.

THE annual visitation of the Royal Observatory, Greenwich, will be held on Saturday next, June 4.

THE following have been elected honorary and foreign members of the Chemical Society :—Prof. A. H. Becquerel, Prof. C. A. L. de Bruyn, Prof. F. W. Clarke, Madame Curie, Prof. C. T. Liebermann and Prof. E. W. Morley.

A DEPUTATION from the Yorkshire Philosophical Society will wait upon the York City Council on June 6 with the object of asking the corporation to issue an invitation to the British Association to make York the meeting place in 1906.

THE death is announced of M. Charles Soret, formerly rector of the University of Geneva, and a member of council of the French Physical Society.

THE Lombardy *Rendiconti* announces the death of Prof. Amato Amati, one of the most energetic educationists in Italy, and the author of works on Dante and on geography.

THE death is announced of M. E. D. del Castillo, who prepared a flora of the French islands of Polynesia and described a portion of the plants brought from Madagascar by M. Alfred Grandidier.

AT a meeting of the General Medical Council on Tuesday, the following resolution was passed :—" That the president (with the chairman of the Pharmacopeia Committee) be requested to inform the Lord President of the Privy Council that in the opinion of the council it is desirable that after a sufficient period, to be fixed by law, the metric system of weights and measures should become the one legal system for the preparation and dispensing of drugs and medicines ; that the council would view with favour the passing into law of a Bill such as that now before Parliament entitled the 'Weights and Measures (Metric System) Bill' ; and that in that event the council would be prepared to take all necessary steps to give effect to the law by making the proper modifications in the 'British Pharmacopœia.' "

A REUTER message from Wellington, New Zealand, reports that the King has sent the following telegram to Captain Scott, leader of the National Antarctic Expedition :—" I have read with interest your report, which Sir Clements Markham sent me. I congratulate you and your gallant crew on your splendid achievements, and wish the *Discovery* a safe journey home. I hope to see you on your return to England."

IN a letter to the secretary of the Scottish Antarctic Expedition, says the *Times*, Mr. W. S. Bruce, the leader of the expedition, remarks :—" We have reached the south-eastern extremity of the Weddell Sea, discovering there a great barrier of ice, part of the Antarctic Continent. We have gone 215 miles further south than last year, and 180 further than Ross in this part of the Antarctic regions. We got beset here in 74° S., 23° W., and were frozen in for a week, from the 7th to the 12th of March. When we got out by chance I thought it wisest not to proceed further in trying to get south and west, but to continue our programme to the north-east. We have sounded in depths up to 2900 fathoms and trawled in depths of 2660 fathoms (where Ross marks 4000 fathoms, no bottom). "

A REUTER message from Rome reports that the Marconi wireless telegraph stations at Bari and Antivari (Montenegro) have now been erected for some time, and are in regular working order. The high power station at Coltno (Pisa), near the Royal farm of San Rossore, will be the

largest in the world, and will be built entirely of stone. It will be ready in August or September, after which the engines and other apparatus will be installed, so that it may begin working not later than the beginning of 1905. The Coltno station will be able to communicate with Great Britain, Canada, the United States, and the Netherlands, as well as with all vessels in the Mediterranean, the Baltic, the Red Sea, the Atlantic Ocean, and the Indian Ocean.

THE eighty-seventh annual meeting of the Société helvétique des Sciences naturelles will be held at Winterhour from July 30 to August 2. The business of the association will be transacted in seven sections as follows :—mineralogy and geology, botany, zoology, chemistry, physics and mathematics, medicine, and civil engineering. The annual meetings of the Swiss societies of geology, botany, zoology, chemistry and of the Société zurichoise de Physique will be held at Winterhour at the same time. The president of the association will be Prof. J. Weber, the vice-president Prof. E. Lüdin, and the secretary M. E. Zwingli, to whom all communications should be addressed at Geiselweidstrasse, Winterhour.

IN recent numbers of NATURE (March 24 and April 21) Prof. Nagaoka and Prof. Franklin have described methods for demonstrating the change of length of iron wire by magnetisation. Prof. J. C. McLennan, University of Toronto, writes to say that a simple and satisfactory method of exhibiting this phenomenon is described in the *Physical Review*, vol. iv., No. 35, July, 1898, and consists in the use of an optical lever attached to the test specimen.

MR. T. TERADA writes to us from the College of Science, Tokyo, to direct attention to an optical illusion observed when lycopodium powder strewn on the surface of water is made to gyrate by a jet of air. After the whirling powder has been fixedly regarded for some time, and the eyes are directed to an adjoining table, the surface of the table appears to move in a direction contrary to that of the lycopodium.

DR. D. PACINI sends us from Rome an account of careful experiments made by him with the object of observing the effects of *n*-rays described by M. Blondlot and other investigators. Though his observations were made under very favourable conditions, he was unable to detect any increase of luminosity of a phosphorescent screen caused by unknown rays from strained or tempered steel, an Auer lamp, a Nernst lamp, sound vibrations, or a magnetic field, though various French observers have affirmed that in each of these cases *n*-rays are emitted which produce an effect upon the screen.

IN the course of an interview reported in the *Westminster Gazette* of Friday last, Lord Kelvin is reported to have expressed himself as being decidedly of the opinion that the source of energy of the heat emitted by radium is not in the element itself. He remarked :—" It seems to me absolutely certain that if emission of heat at the rate of 90 calories per gram per hour found by Curie at ordinary temperature, or even at the lower rate of 38 found by Dewar and Curie from a specimen of radium at the temperature of liquid oxygen, can go on month after month, energy must somehow be supplied from without."

A PAPER on crystalline glazes and their application to the decoration of pottery, read before the Society of Arts by Mr. William Burton, and printed in the current number (May 27) of the *Journal* of the society, is a noteworthy contribution both to the science and the art of pottery. By applying scientific knowledge and method to the production

of glazes on pottery, Mr. Burton has been able to obtain with precision a variety of crystalline and opalescent effects of decided novelty and beauty. This has only been rendered possible by making many experiments to discover the influence of the materials and the temperature on the effects produced and by having each stage of the process under perfect control. In one of the new glazes produced in this way, artificial crystals which are developed in full perfection at temperatures from 1000° C. to 1030° C. are reabsorbed into the glaze as the temperature is increased, and remarkable changes of colour are assumed until at a temperature of 1070° C. the crystals are entirely reabsorbed. The crystalline effects produced at the different temperatures are of interest to the mineralogist, and the striking appearance of the pottery upon which the crystals are developed demonstrates the advantages of the application of science to industrial art.

THE first excursion of the summer session of the Belfast Naturalists' Field Club was held on May 21, when 167 members and their friends visited Hillsborough to explore and examine the demesne of the Marquis of Downshire. Though this is the largest attendance at any one of the meetings of the society, the Belfast Naturalists' Field Club is, in the forty-second year of its existence, one of the most active Irish societies devoted to the practical study of natural history. The main object of the club is to interest people generally in the study of natural objects, and this is, of course, all that can be accomplished in gatherings of the size mentioned. We are glad to know, however, that many of the members have been able, by private additional visits, to add to the scientific knowledge of the district. The honorary secretaries of the club are Mr. Nevin H. Foster, Hillsborough, co. Down, and Mr. James Orr, 17 Garfield Street, Belfast.

THE *Zeitschrift der Gesellschaft für Erdkunde* contains an extremely interesting report of a lecture on western Asia Minor by Dr. A. Philippson. Having completed his work in Greece, Dr. Philippson has undertaken the investigation of this little known region, which is of special interest to Germany on account of the Anatolian Railway. His paper summarises the results of explorations up to the present time.

UNDER the title "A Case of Geographic Influence upon Human Affairs," Mr. George D. Hubbard discusses the results of glaciation in a limited portion of the State of Illinois in the *Bulletin* of the American Geographical Society. The subject is dealt with "from the point of view of geographic influence upon plants, crops, and animals, and upon man's distribution, occupations, successes, and failures," and the paper is a good illustration of the method of treating the geological element in questions of the kind.

IN an article on the developmental changes in some common Devonian brachiopods (*Amer. Journ. Science*, April), Mr. Percy E. Raymond describes, from abundant material, the life-changes undergone in a number of species of brachiopods, with especial reference to the character of the neponic shell, the development of the pedicle tube and

the deltidial plates, and the acquirement of surface characters. The specimens were obtained from the Moscow (Hamilton) shales, near Canandaigua Lake, New York. They occurred in layers of impure limestone, but were completely replaced by silica, and when the rock was etched in acid the fossils were left in a remarkably perfect condition. The fauna comprised many forms of invertebrates, besides brachiopods, and included many individuals in immature stages.

A RESTORATION of the Ornithosaurian *Pteranodon* has been prepared by Mr. G. F. Eaton, as the contribution of the Department of Vertebrate Palaeontology of the Yale Museum to the St. Louis Exhibition. Particulars, accompanied by a half-tone engraving (which we are enabled to reproduce), have been published in the *American Journal of Science* (April). The genus was originally described by Marsh from the Cretaceous rocks of North America, but further details of its structure have since been obtained. Mr. Eaton points out that the sclerotic circle is composed of twelve thin plates of bone arranged with overlapping edges, so as to form a hollow truncate cone, similar in shape to the avian sclerotic circle. With regard to the vertebræ, there are nine cervicals. In the dorsal series are included eight vertebræ, ankylosed to form the notarium, and four free dorsals intervening between the notarium and the

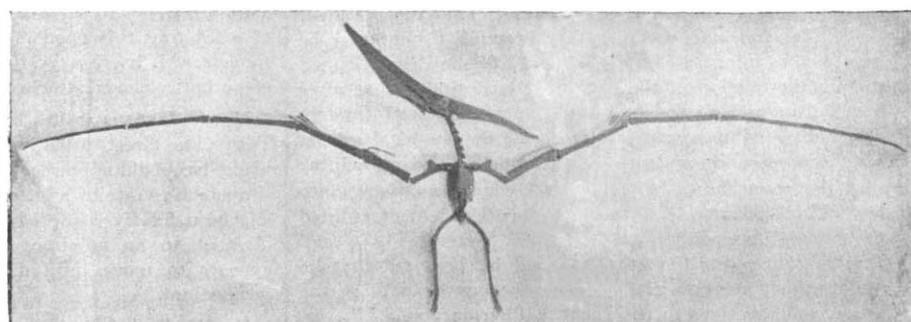


FIG. 1.—Restoration of *Pteranodon longiceps*, Marsh. Scale an inch to about 3 feet.

sacrum. By assuming that the first four vertebræ of the sacral series (in the broader sense) are homologues of the lumbars of other groups, the total number of presacral vertebræ would appear to be twenty-five. This compares closely with the supposed number of presacrals in the Eusuchia.

IN the second part of vol. xxxvi. of the *Memoirs* of the Russian Geographical Society, for general geography, Prof. N. Zarudnyi gives the second part of the account of his journey to eastern Persia. It contains a description of the 421 species of birds found by him, with the addition of a few species previously observed by Dr. Blanford and Dr. Aitchison. It would be premature as yet to draw any general conclusions concerning the relations between the avifauna of eastern Persia and the other parts of the Iran plateau and the Turan lowlands. Consequently, the Russian ornithologist only gives a description of each species, with interesting notes concerning the habits of the species and its distribution. Dividing his region into six districts, he gives the lists of nesting and temporary visiting birds for each district separately.

THE larval eyes of the mollusc Chiton and their ultimate fate form the subject of an article by Mr. H. Heath in the March issue of the *Proceedings* of the Philadelphia Academy.

In a recent issue (vol. Ixxii., No. 3) of the *Journal* of the Asiatic Society of Bengal, Mr. E. P. Stebbing records the occurrence in the Himalaya of a beetle of the genus *Thanatus*, a discovery which may be of some commercial importance, owing to the fact that these insects feed on the bark-beetles so destructive to timber.

A FEATURE in the report of the proceedings of the sixteenth annual meeting of the U.S. Association of Economic Entomologists (Ent. Divis. Agric. Dept., *Bull.* No. 46), is an address on insect photography by Mr. M. V. Slingerland. While urging the importance of this comparatively new application of photography, the author points out that many of the replicas of photographs published in current literature are of a very inferior type.

IN THE May number of the *Zoologist* the editor continues his notes on the influence of rivers on animal distribution, dealing, first, with their active, and, secondly, with their passive effect as dispersers. A very large number of cases are cited where animals—singly or in parties—have been involuntarily carried down by rivers, while in the second part the author has been equally industrious in collecting records of instances where animals have swum rivers of considerable breadth.

INVERTEBRATES form the subject of the four articles in the latest issue (vol. Ixxvi., part iv.) of the *Zeitschrift für wissenschaftliche Zoologie*. Messrs. Schuberg and Schröder describe a new thread-worm infesting the muscles of leeches of the genus *Nephelis*. The spermatogenesis of sponges and coelenterates is discussed by Mr. W. Görich, while Mr. C. Julin gives the result of his investigations into the phylogeny of tunicates, and Dr. H. Simroth describes a remarkable new slug, *Ostracolethe fruhstorferi*, from Tonquin, and its bearing on the classification of gastropods.

ACCORDING to the classification generally in use in this country, fishes are divided into the four subclasses Elasmobranchii, Holocephali, Dipnoi and Teleostomi, while the Palaeozoic Ostracodermi (*Pteraspis*, *Cephalaspis*, *Pterichthys*, &c.) are placed in a class by themselves. Mr. C. T. Regan, of the British Museum, in a paper on the phylogeny of the Teleostomi, published in the May number of the *Annals and Magazine of Natural History*, has, however, arrived at the conclusion that a much simpler scheme is advisable, and that it will suffice to divide the class (inclusive of the Ostracodermi) into the two groups Chondropterygii and Teleostomi, the former including the Elasmobranchii and Holocephali, together with *Pteraspis* and its allies, and the latter all the rest. The most primitive group of Teleostomi is considered to be the Chondrostei (sturgeons and Palaeoniscidae), from which all the others are derived. One branch gave rise to the Crossopterygii, from which in turn sprang the Dipnoi (*Dipneusti*), the author regarding the resemblance which has long been known to exist between the fins of the two latter groups as over-riding the differences in the skull-structure. The Teleostei take origin as a separate branch from the Chondropterygii. The most pronounced departure from the views of others is, however, the brigading of the Ostracodermi (exclusive of *Pteraspis*, which is regarded as a chondropterygian) with the Arthropoda (*Coccopterus*, &c., generally grouped in the Dipnoi), as an offshoot of the Crossopterygii, under the title of Placodermi. Mr. Regan will, we think, have considerable difficulty in persuading palaeontologists to accept this part, at any rate, of his scheme.

NO. 1805, VOL. 70]

IT IS stated in *La Nature* (May 28) that Dr. Chaput has found that peroxide of zinc (discovered by Elvas) proves an efficient substitute for peroxide of hydrogen for dermatological and other uses, and is much less irritating than the last named substance.

THE April issue of the *Journal of Hygiene* (vol. iv., No. 2) contains a number of most interesting and important contributions. Staff Surgeon Dalton, R.N., and Dr. Eyre have investigated the thermal death point of the *Micrococcus meletensis*, which proves to be 57°.5 C. They describe an apparatus whereby constant temperatures may be maintained, and suggest standard conditions for the determination of the thermal death points of micro-organisms. Dr. Houston, in a paper on the bacteriological examination of oysters and estuarial waters, details the main facts obtained during an investigation undertaken on behalf of the Royal Commission on Sewage Disposal. Dr. Nuttall and Mr. Inchley describe an improved method for measuring the amount of precipitum in connection with tests with precipitating antisera. Dr. Stevenson suggests a method of estimating future populations. Messrs. Bowhill and Le Doux give a note on a case of piroplasmosis canis, a tick disease of the dog, occurring near Grahamstown, and Dr. Nuttall describes the disease in a lengthy article illustrated with photos and temperature charts. Lastly, Dr. Graham Smith describes very fully a study of diphtheria bacilli isolated from 113 individuals during an outbreak of diphtheria at Cambridge in 1903.

THE fifth volume (second series) of the *Publications of the U.S.A. Naval Observatory* is devoted to a complete record of the meteorological observations made at the new Naval Observatory, Georgetown Heights, during the years 1893–1902 inclusive. After a preliminary description of each of the instruments used, the readings of the barometer and the wet and dry bulb thermometers, and the cloud and wind observations at three-hourly intervals during each day are given. The whole of the results are summarised in an exhaustive series of tables which conclude the volume.

IN the *Annals of Botany* for January, Mr. Harold Wager discusses the function of the nucleolus in plants and animals, and, basing his deductions upon the investigation of the nucleus in the cells of the root-apex of *Phaseolus*, he comes to the conclusion that the nucleolus is intimately bound up with the formation of the chromosomes, and that there is a definite continuity of nuclear substance from mother-nucleus to daughter-nucleus through the chromosomes. Mr. Wager has also attacked the problem of the cell structure in the Cyanophyceæ, and in a preliminary paper communicated to the Royal Society he claims that the central body of the Cyanophyceæ is a nucleus of a simple or rudimentary type.

THE second volume of the second revised and enlarged edition of Prof. W. Pfeffer's work on "Pflanzenphysiologie" (Leipzig : Engelmann; London : Williams and Norgate) has been received. The volume is chiefly concerned with transformations of energy resulting in various movements in plants.

THREE pamphlets on radium and radio-activity have just been received from German publishers. One is a second edition of a useful summary, by Prof. K. Hofmann, of investigations of Becquerel and other rays from 1896 to the present time; the title is "Die radioaktiven Stoffe nach dem neuesten Stande der wissenschaftlichen Erkenntnis" (Leipzig : Barth). The same publisher has

issued a translation, by Prof. G. Siebert, of Mr. F. Soddy's Wilde lecture (see NATURE, March 3, p. 418) on the evolution of matter as revealed by the radio-active elements. A translation, by Mr. E. Ruhmer, of a lecture by Mr. W. J. Hammer, delivered before the American Institute of Electrical Engineers, on radium and other radio-active substances, has been issued by the publishers of *Der Mechaniker*, Berlin.

OUR ASTRONOMICAL COLUMN.

THE EXTREME ULTRA-VIOLET SPECTRUM OF HYDROGEN.—In No. 4, vol. xix., of the *Astrophysical Journal*, Mr. Theodore Lyman, of Harvard University, gives a list of wave-lengths for the lines in the extreme ultra-violet spectrum of hydrogen, first discovered by Dr. Victor Schumann. In Mr. Lyman's experiments the light from the discharge tube was transmitted through fluorite windows and a tube containing hydrogen at very low pressure, and the spectrum was formed by a concave grating ruled on speculum metal. He found that from the region about $\lambda 1854$ to about $\lambda 1700$ the spectrum is almost continuous, containing only a few faint lines. About $\lambda 1700$ there is an absorption band, the width of which seems to depend upon the purity of the hydrogen enclosed in the apparatus. Beyond $\lambda 1650$, towards the more refrangible limit of the spectrum, numerous fine lines exist, and of these Mr. Lyman has measured 134. In the table accompanying the paper the wave-lengths (to five figures) and intensities of 133 lines between $\lambda 1033$ and $\lambda 1878$ are given. It is interesting to note that the superior reflecting power of speculum metal for these short wave-lengths has been incidentally demonstrated by the use of the grating.

VARIABLE RADIAL VELOCITY OF η PISCIS.—A series of spectrograms of η Piscis obtained by Prof. H. C. Lord, of Columbus (Ohio), and extending over the period December, 1901, to January, 1904, indicate that this star has a variable radial velocity of long period.

From measurements of H_γ and thirteen carefully selected iron lines the following results, among others, were obtained :—

Date	Radial vel. (Reduced to Sun)	Date	Radial vel. (Reduced to Sun)
Dec. 15, 1901 ...	+18·5 kms.	Dec. 15, 1903 ...	+9·5 kms.
Jan. 10, 1902 ...	+25·4 „	Jan. 9, 1904 ...	+10·6 „

The sharp definition of the lines in the spectrum of η Piscis render its radial velocity especially suitable for spectroscopic measurement, and this fact, with other confirmatory evidence, leads Prof. Lord to the conclusion that the variability is real (*Astrophysical Journal*, No. 4, vol. xix.).

PROPOSED NEW OBSERVATORIES.—In a report published by the Carnegie Institution at Washington (December, 1903), a committee consisting of Profs. Boss, Campbell and Hale, which was appointed by that institution "to consider certain large projects in astronomy," strongly urge the establishment of an observing station in the southern hemisphere for the prosecution of certain definite observations which it is hoped might be completed in ten or twelve years. They also recommend that an observing station for solar investigations in an exceptionally favourable atmosphere should be established and maintained throughout one full sun-spot period (eleven years) at least. Further, they urge the construction and maintenance of a large reflector for astrophysical investigations at one, or both, of the proposed stations. These recommendations are supplemented by a detailed programme of the work that might be accomplished and a carefully prepared scheme for the necessary buildings and staffs.

In Appendix A Prof. J. W. Hussey, who was deputed to explore California and Arizona in order to determine the most suitable site for the proposed solar observatory, gives

an interesting account of his search, which led to the recommendation of Mount Wilson (California) as offering the best facilities for the work. Appendix B consists of a number of letters from eminent astronomers in answer to a confidential inquiry as to their views on the establishment of the proposed observatories.

VARIABILITY OF SPARK SPECTRA.—Some interesting results have been obtained by Mr. A. S. King, of Bonn, from a long series of experiments on the variability of spark spectra with various conditions of current, discharge and environment. So far, the spark spectra of six metals, Cd, Zn, Mg, Ca, Hg and Al, have been studied under different conditions, and the results of the experiments have led to the following conclusions :—

(1) The lines of each metal may be divided into two groups according to their behaviour when the conditions are varied. The first group contains all the "series" lines and a few others, whilst the second group includes the lines for which no "series" relations have yet been discovered. (2) The lines of both groups are enhanced by capacity and weakened by self-induction, but those of the second group are much more affected in this way than those of the first. (3) Of the two "subseries" of each metal the first is much more sensitive to all changes. (4) The last members of a series are reduced more by self-induction than the first, a shift of maximum intensity towards the greater wave-lengths being produced. "Capacity" has the opposite effect.

Mr. King describes his experiments, and discusses the results in detail in a paper published in No. 4, vol. xix., of the *Astrophysical Journal*, where some of his photographs are reproduced.

REPORT OF THE OXFORD UNIVERSITY OBSERVATORY.—In the twenty-ninth annual report of the Oxford University Observatory, Prof. H. H. Turner gives a résumé of the work accomplished during the twelve months from May 1, 1903, to April 30, 1904. He again refers to the urgent need for a residence attached to the observatory, but on account of the general lack of funds at the university he does not press the matter.

The measurement and reduction of the plates for the Oxford section of the International Astrographic Chart is now complete, and the press copy of the work has been lodged at the Bodleian Library for safety until it is possible to raise the 2000*l.* necessary for its printing and publication. It was proposed that the experience gained by the observatory staff in the production of this work might be utilised in measuring the plates taken at one of the southern observatories where the lack of funds and instruments prohibits the completion of the work. To this end fifty plates were received from the Perth (W. Australia) Observatory, and on measuring twenty-one of them it was found that their reduction could be easily and economically carried out at Oxford.

A stereo-comparator, which is essentially an elaborate and improved stereoscope for the comparison of star-places on any two plates of the same region, but taken at different epochs, has been presented to the observatory by Mr. C. L. Brook, and has been proved to be efficient and easily manipulated.

THE STEREO-COMPARATOR.—In No. 5, vol. xii., of *Popular Astronomy*, there appears a translation of a paper communicated to the Astronomical Society of Belgium by Dr. G. van Biesbroeck, in which the author traces the evolution of, and describes, the stereo-comparator invented by Dr. Pulfrich; he also gives brief accounts of the researches wherein the instrument will prove to be an extremely useful aid. Amongst the latter he notices the study of cometary features, the detection of stellar proper motions, and the discovery of minor planets. As evidence of the comparator's efficacy in the last named field, he mentions that Dr. Pulfrich, who was totally without experience in minor planet work, not only found several asteroids which Prof. Wolf had recognised on a pair of plates taken at Heidelberg, but also discovered a new one, which the careful scrutiny of the latter observer, under the ordinary conditions, had failed to reveal.